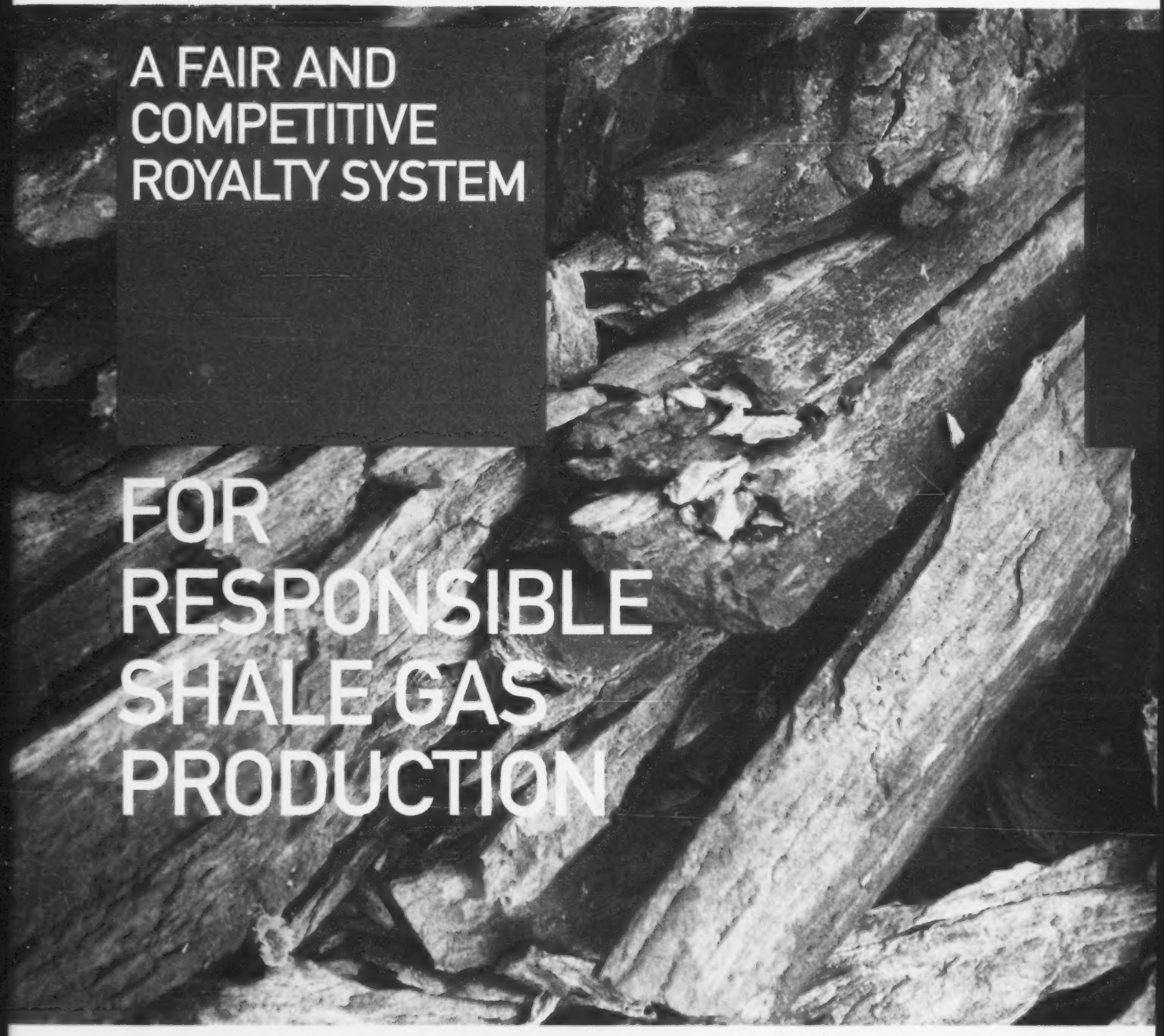
Budget
2011-2012



A FAIR AND COMPETITIVE ROYALTY SYSTEM FOR RESPONSIBLE SHALE GAS PRODUCTION

Québec

A FAIR AND COMPETITIVE ROYALTY SYSTEM

FOR RESPONSIBLE SHALE GAS PRODUCTION

Finances Québec

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2011-2012 Budget

A Fair and Competitive Royalty System
For Responsible Shale Gas Production

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INTRODUCTION

For several months, the prospects of shale gas production have raised great concerns among the Québec population.

❑ The report of the Bureau d'audiences publiques sur l'environnement

At the end of summer 2010, the government took account of those concerns by entrusting the Bureau d'audiences publiques sur l'environnement (BAPE) with the mandate of holding public consultations on this issue.

The government asked the BAPE to suggest guidelines for a legal and regulatory framework to guarantee, "in respect of natural gas exploration, production and collection infrastructures, the safe development of this industry and in keeping with sustainable development".[1]

The BAPE submitted its report to the government on February 28 of this year.

❑ Initial response

After rendering it public on March 8, the government gives an initial response to the BAPE report in the 2011-2012 Budget, in view of the economic issues at stake. The changes to the royalty system correspond to several of the concerns raised by the BAPE.

— This response does not prejudge the other actions that subsequently will be taken in response to the recommendations issued by the BAPE.

— Nor does it mean that the government assumes that the issues surrounding the prospects of a major development in the shale gas industry in Québec have been settled.

  As the government has indicated time and again, large-scale development of shale gas will be undertaken only insofar as such development is carried out in a manner that respects the environment and is safe for all citizens.

❑ Preparing right now

For the government it is important, however, to prepare right now for a possible future, by immediately providing answers to three questions related to the economic issues surrounding shale gas production.

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1 Mandate entrusted to the BAPE pursuant to section 6.3 of the *Environment Quality Act*. This mandate commenced on September 7, 2010.

— The BAPE, echoing the concerns of a great many citizens, criticizes the **price at which gas and petroleum exploration rights have been sold.**

The government is announcing that the current system of rights and licences will soon be modified in response to current requirements and the legitimate expectations of citizens.

— Since 2001, Québec has offered a system of **tax support for exploration.**

In the case of shale gas exploration, this system – the tax credit for mining, oil, gas or other resources (tax credit for resources) – will be **replaced**[2] by a **non-refundable royalty credit.** Also, in order to pursue exploration so as to determine the industry's real potential, a new targeted and balanced support mechanism will be introduced: the **gas development program.**

— The **royalty regime** in effect in Québec prompted numerous criticisms, since it was based on a fixed rate not pegged to the characteristics of the deposit or the market.

This system is replaced by a **new royalty regime** based on a progressive rate pegged to the price of the resource and the productivity of the well. This system will take effect once the strategic environmental assessment recommended by the BAPE has been completed and the legislative and regulatory framework has been adapted to its conclusions.

❑ Major initiatives

In the 2011-2012 Budget, the government is therefore presenting:

— the **new shale gas royalty regime** that it is introducing;

— the **gas development program** offered to businesses;

— an **initial assessment of the anticipated fiscal and economic benefits** of these major reforms.

First, however, it is essential to review the **context of shale gas development in Québec.**

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2 As the new shale gas royalty regime takes effect.

1. THE CONTEXT OF SHALE GAS DEVELOPMENT IN QUÉBEC

1.1 Preconditions for shale gas development in Québec

The development of shale gas in Québec raises concerns among the population. The government therefore intends to impose preconditions for the introduction of this industry.

The government seeks to reconcile the development of gas resources in Québec with sustainable development. To do so, it will implement all the necessary measures to insure that natural gas is produced in a manner that is environmentally responsible and safe for citizens.

These measures include, in particular:

— the introduction of a new legal and regulatory framework in keeping with sustainable development, where applicable, in follow-up to the strategic environmental assessment;

— the adoption of a new royalty regime;

— the forthcoming updating of the laws and regulations on oil and gas.

The government thus reiterates its commitment to see that the development of the shale gas industry in Québec will not be carried out to the detriment of the environment or without the support of the population.

❑ Report of the Bureau d'audiences publiques sur l'environnement

In its report, made public on March 8, 2011, the BAPE suggests in particular that the government should take steps to improve its knowledge of the industry's impact before giving final form to the whole of its laws and regulations.

— To that end, the BAPE recommends the creation of a committee charged with conducting a strategic environmental assessment[3] for the wells that will be drilled during the assessment period, in order to carefully assess the aggregate impacts of all operations involving fracturing, a technique used for extracting shale gas.

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3 Throughout the duration of the strategic environmental assessment, all the fractured wells will be monitored.

In response to the recommendations of the BAPE, the government has already made certain commitments and is continuing to analyze all of the recommendations.

The government is already announcing its intentions in respect of royalties by introduing a new system taking into account some of the recommendations by the BAPE.

Mandate entrusted to the BAPE and recommendations concerning the royalty regime

The BAPE was mandated to:

- propose a framework for development of shale gas exploration and production, so as to promote harmonious cohabitation between these activities and the affected populations, the environment and the other sectors of activity present in the territory;
- propose guidelines for a legal and regulatory framework that will guarantee, for the exploration and collection infrastructures segments of the natural gas industry, safe development of this industry in keeping with sustainable development.

In its report, in connection with the introduction of the royalty regime, the BAPE recommends, in particular:

1. recovering, as rapidly as possible, the shortfall arising from low duties on resource rights, and establishing a tender system for future concessions;
2. establishing a royalty regime providing the government with substantial revenues so as to generate the maximum collective benefit from the resource;
3. paying a portion of the sums derived from the royalties collected on the resource into the Generations Fund;
4. making an upward adjustment in the amounts of required work carried out on territories subject to an exploration licence;
5. not authorizing transfers of exploration licences to third parties;
6. aiming for long-term resource conservation, while maximizing royalty revenues and stimulating exploration but discouraging over-hasty development;
7. providing a mechanism, independent of the royalties collected, for compensating communities for the real costs and inconveniences occasioned by the development of the resource (user-payer);
8. establishing fees, reflecting actual costs as closely as possible, to be charged for the various applications related to the natural gas industry;
9. that the *Act respecting Insurance* should stipulate that damage caused to a third party (residential or commercial sector) by technological accidents will be covered by insurers (as is the case elsewhere in Canada).

Source: Bureau d'audiences publiques sur l'environnement, *Développement durable de l'industrie des gaz de schiste au Québec*, Report 273, February 2011.

The initiatives announced in the 2011-2012 Budget constitute an initial response by the government to the BAPE report, in view of the economic issues at stake. They address the concerns formulated in points 1, 2, 3, 6 and 7.

❑ A transition period

During the transition period leading to the introduction of the new royalty system, businesses will have the option of continuing under the current system, until completion of the strategic environmental assessment, or participating in the new gas development program.

— The government recognizes the importance of the investments made in the past. Businesses that have completed wells – well drilling and completion[4] – before the introduction of the new system will be able to continue operating under the current royalty regime throughout the production life of those wells, even after the new royalty regime takes effect.

— The government will also allow businesses participating in the strategic environmental assessment to make their wells subject retroactively to the gas development program.

When the strategic environmental assessment is completed, the government could also propose new economic measures so as to take into account the information collected during the assessment.

4 Includes fracturing.

1.2 A potential to be determined

Québec possesses undeniable advantages favouring the production of shale gas.

However, the potential remains to be determined: according to the industry, some 150 to 200 wells would have to be drilled, requiring investments of nearly $2 billion, to reach the stage of large-scale commercial production.

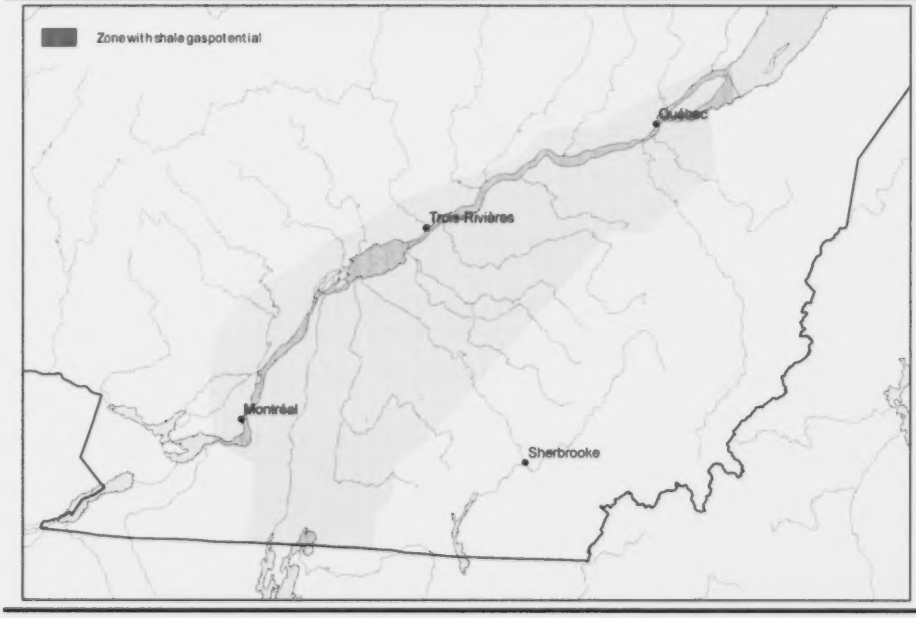
❑ The industry in Québec

Thanks to their geology, the St. Lawrence lowlands possess a subsurface rich in hydrocarbons, particularly shale gas, whose potential for commercial production has yet to be proved.

The Utica shale play in Québec is located near local consumption markets and transportation and distribution networks that supply the Montréal and Québec City markets, as well as the northeastern United States market.[5]

FIGURE 1

Gas shales – St. Lawrence lowlands



Sources: Ministère des Ressources naturelles et de la Faune and Ministère des Finances du Québec.

5 National Energy Board, *A Primer for Understanding Canadian Shale Gas – Energy Briefing Note*, November 2009.

— This fact is an advantage, since it considerably reduces network connection costs and transportation costs for natural gas.

— Also, gas extracted from the Utica play is of a higher quality than gas from other shales: it contains few impurities. It thus requires less processing, thereby lowering the costs to be incurred.

❑ Recoverable reserves

Based on the information available to date, the recoverable shale gas reserves located in Québec's territory total 8 750 to 40 750 billion cubic feet, which could represent a potential production value of $38.3 to $178.5 billion.[6]

When up to speed, provided economic conditions are favourable, the industry could bring some 250 wells into production each year and could continue to do so over a period of 16 to 72 years, depending on reserves yet to be confirmed.

TABLE 1

Québec's estimated shale gas potential
(billions of cubic feet (Bcf) and billions of dollars)

	Conservative estimate	Optimistic estimate
Potential (Bcf)	35 000	163 000
Recoverable potential (Bcf)[1]	8 750	40 750
Number of wells required[2]	3 900	18 100
Production value[3] ($B)	38.3	178.5
Required period of activity[4] (years)	16	72

1 Technological improvements should increase the recoverable potential for each well.
2 Based on a capacity of 2.25 Bcf.
3 At the average annual NYMEX price for 2010, i.e. $4.38 per thousand cubic feet.
4 With an additional 250 wells annually.
Source: Ministère des Ressources naturelles et de la Faune and Ministère des Finances du Québec.

6 At the average annual NYMEX price for 2010, i.e. $4.38 per thousand cubic feet.

❑ A relatively modest industry in Québec

Despite its substantial estimated potential compared to that of other jurisdictions, the industry will nevertheless remain relatively modest in Québec.

In fact, an optimistic view of the recoverable potential implies approximately 18 100 wells drilled in Québec over a period of nearly 70 years. By comparison, more than 28 000 wells have already been drilled in British Columbia and 400 000 in Alberta, with the particular result that those two provinces have been able to collect substantial revenues from royalties on hydrocarbons.

TABLE 2

Proportion of revenues from royalties[1] on natural resources
(millions of dollars, 2009-2010)

	British Columbia		Alberta		Saskatchewan		Newfoundland and Labrador		Québec	
	($M)	%[2]	($M)	%[2]	($M)	%[2]	($M)	%[2]	($M)	%[2]
Hydrocarbons	1 350	3.6	6 737	17.1	1 486	14.5	2 121	29.1	1	0.0
Other natural resources	1 296	3.5	31	0.1	425	4.1	n/a	n/a	763	1.0
Total royalties	**2 646**	**7.1**	**6 768**	**17.2**	**1 911**	**18.6**	**2 121**	**29.1**	**764**	**1.0**
TOTAL REVENUES[3]	**37 521**	**100.0**	**39 410**	**100.0**	**10 266**	**100.0**	**7 297**	**100.0**	**73 626**	**100.0**

1 Net royalties.
2 As a percentage of the province's total revenues.
3 Consolidated total revenues.
Source: Provincial public accounts and Ministère des Finances du Québec.

❑ Factors crucial to economic potential

Beyond the production potential, the introduction of the new royalty regime benefiting citizens relies on economically profitable businesses. The principal factors influencing the industry's profitability are:

— geological characteristics or the actual production potential;

— changes in the price of the resource;

— production costs;

— competition by other jurisdictions that have reached a stage of development and a critical mass allowing for lower service costs, particularly with respect to access to equipment;

— the royalty regime.

■ Geological characteristics

The first element to be considered is gauging the industry's profitability consists in determining the level and the quality of recoverable or marketable reserves. While in conventional gas reservoirs it is possible to recover up to 95% of reserves, in the case of shale gas only about 20% can be recovered.

The initial volume[7] of production and the speed at which production declines are generally considered to be reliable indicators of a well's productivity.[8]

As a general rule, a high initial volume implies a high productivity and is a good indicator of a well's marketable reserve. Deeper wells are often more productive, but they are also more costly to operate.

A well's production is initially very high during the first months, but rapidly declines in the following years and remains low over a long period.

— The speed with which production declines can vary significantly from one well to another.

— Approximately 50% of the marketable volume is extracted after only five years, whereas the potential lifespan of a well may extend to nearly 40 years.

---

7 Initial volume is determined by the first 30 days of production.

8 For purposes of analysis, it is generally assumed in this document that a standard well in Québec will have a potential, at maturity, of 2.25 Bcf and an initial volume of 2 250 Mcf per day.

The wells drilled to date in Québec have a lower productivity than those in British Columbia and Alberta. However, developments in drilling and fracturing technologies should make it possible, in the coming years, to increase the marketable potential, as is the case elsewhere.

— For example, whereas the average productivity of wells in the Montney shale play in British Columbia was approximately 700 thousand cubic feet per day in 1998, average daily production rose to an average of nearly 4 000 thousand cubic feet by 2010.

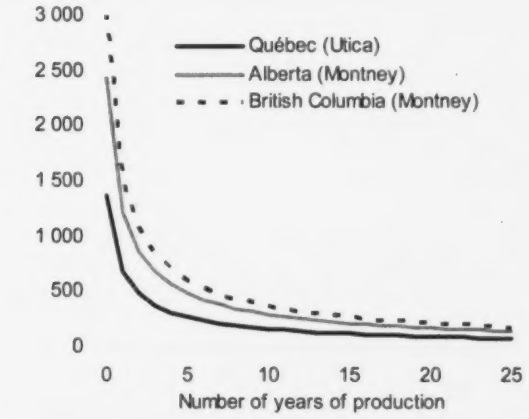
— Trends in productivity nonetheless represent a risk to be considered by the industry in Québec.

The quality of the gas also influences production value. Due to the high quality of Utica shale gas, processing costs could be significantly lower compared to other provinces.

Given all these variables to be considered, the actual potential of the resource in Québec can be determined only by further drilling.

CHART 1

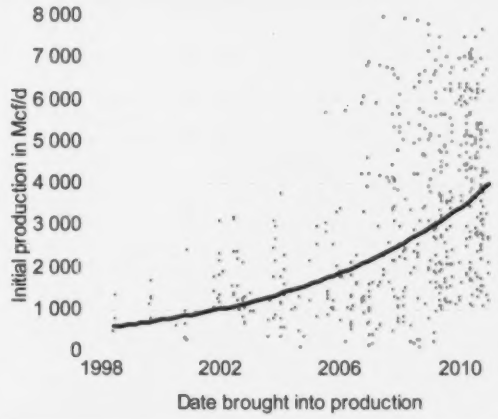
Comparison of a standard well's productivity with that in other jurisdictions
(thousands of cubic feet per day)



Sources: Alberta Department of Energy and Ministère des Finances du Québec.

CHART 2

Productivity trends for wells in the Montney shale play, British Columbia
(average daily productivity for 30 days)



Source: AccuMap, IHS Production Data.

■ Price of natural gas

The price of natural gas is a crucial element to be considered in calculating the industry's profitability. The price level has an influence on choice and speed of shale gas development.

A number of factors may influence the price of natural gas, such as production levels, demand for gas and the effects of substitution among various energy sources.

At current natural gas prices and current drilling costs, no development project would be profitable in Québec.

The reference price for the North American natural gas market is the NYMEX price, which is based on the Henry Hub in Louisiana. Delivery-to-market costs are added based on the point ("hub") where the gas is traded. Given how close the production sites are to the consumption markets, the selling price in Québec could be $0.25 higher than the NYMEX price.

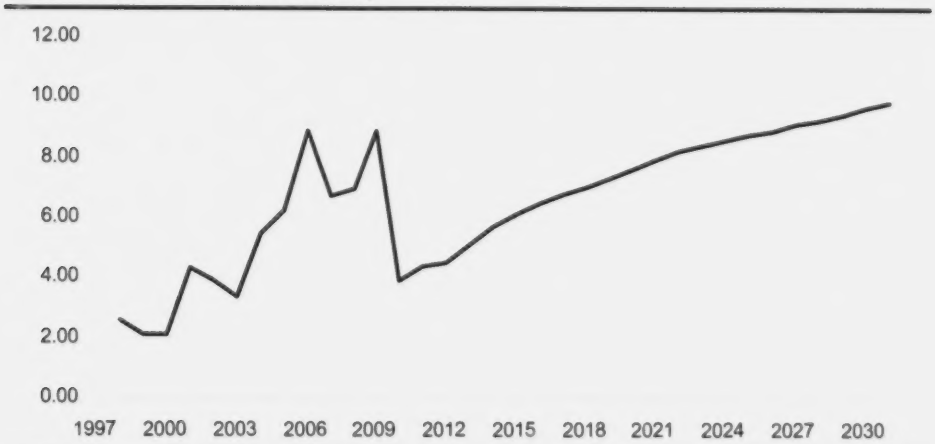
According to forecasts by AJM Petroleum Consultants, an authority in the field, the price of gas ought to increase gradually.

— It is therefore important to consider the projected trends in prices over the medium and long term in estimating the industry's potential gross earnings.

— The real price of natural gas should rise from an annual average of $4.38 in 2010 to $6.00 by 2015. It could reach $9.00 within 15 years.

CHART 3

Forecast of natural gas prices on the NYMEX
(US dollars, thousands of cubic feet)



Source: AJM Petroleum Consultants, December 31, 2010.

■ Production costs

The production of shale gas requires the use of specialized equipment and workers. However the supply of such specialized services cannot be developed in Québec until a critical mass has been reached: currently such services must be imported, at high costs, from Western Canada and the United States.

The development of a Québec service industry is crucial to reducing costs to a level where gas production becomes profitable. Until now, high drilling costs in Québec prevent profitability.

As certain representatives from educational institutions pointed out in their remarks before the BAPE,[9] the supply of training can be adapted to the needs of the labour market for this industry. This will make it possible to offer career opportunities to the population, as well as reduce costs.

As the BAPE recommends, the government will collaborate will the sector to develop know-how in Québec.

The outlays required in order to comply with the regulatory framework is another element entering into production costs. These costs will be spelled out in the definition of the future legal and regulatory framework, in keeping with sustainable development.

■ Competition with other jurisdictions

In addition to taking into account the costs assumed by the industry, the government must take into account the competitiveness of the royalty regime.

— Other jurisdictions have already introduced systems with very generous incentives to promote the development of their industry.

— Québec must therefore also compare its royalty regime with those of other jurisdictions.

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9 Bureau d'audiences publiques sur l'environnement (BAPE), *Développement durable de l'industrie des gaz de schiste au Québec*, Report 273, February 2011, p. 213.

TABLE 3

Systems in effect for shale gas in other jurisdictions

Jurisdiction	Description of the regime and incentives	Rate in effect or royalty credit
British Columbia		
- **Base regime**	Progressive rate (Base 9)	From 9% to 27%
- **Incentives**	Net profit program	From 2% of gross revenues to 35% of net revenues
	Measure for low-productivity wells	From 0% to 27%
	Deep well credit	Up to 4.7 $M[1]
	Summer drilling credit	10% of costs up to $100 000
	Infrastructure credit (roads, pipelines)	Up to 50% of costs
Alberta		
- **Base regime**	Progressive rate	From 5% to 36%
- **Incentives**	Reduction in royalties for the first 36 months	5% (regardless of volume produced)
	Deep well credit applicable solely for the first 5 years[2]	Up to 8 $M[3]
Pennsylvania		
- **Base regime**	Royalty rate being determined based on the potential estimated by the state for a development lease on public lands and by mutual agreement on private lands	Minimum statutory rate of 12.5% Rates from 12.5% to 20% are observed
New York		
- **Base regime**	Royalty rate being determined based on the potential estimated by the state for a development lease on public lands and by mutual agreement on private lands	Minimum statutory rate of 12.5% Rates from 12.5% to 20% are observed

1 Varies depending on depth, region and quality of the natural gas.
2 Businesses must pay minimum royalties of 5%.
3 For drilling beyond a depth of 2 000 metres.
Sources: British-Columbia Ministry of Energy, Oil and Gas Division; Alberta Ministry of Energy; BAPE, Report 273.

❑ An uncertain potential

Despite the fact that initial results are encouraging, the production potential in Québec's territory remains uncertain. For the moment, shale gas development is only in the experimental stage.

— In recent years, a great deal of exploration work has been carried out in Québec's sedimentary basins.

— Since 2007, 28 wells[10] have been drilled in those areas,[11] and of that number, 18 have been fractured in the St. Lawrence lowlands thus far. The investments made are estimated at slightly over $200 million.

This work has not yet made it possible to determine the true gas potential in Québec. Some 150 to 200 additional wells would have to be drilled, representing investments of nearly $2 billion, in order to determine the resource's true potential and, eventually, to undertake large-scale commercial production.

10 Ministère des Ressources naturelles et de la Faune du Québec.

11 The majority of wells drilled to date are vertical wells, which are less costly than horizontal wells.

2. A NEW SHALE GAS ROYALTY REGIME

Québec's current natural gas royalty regime was designed at a time when the prospects for large-scale gas production were unlikely. This regime must therefore be revised to take into account the new reality and the specific nature of shale gas production.

The government is announcing changes in its shale gas royalty regime in pursuit of the goal that all Quebecers should draw a maximum profit from this resource that they collectively own.

— The current royalty regime, with a fixed rate that applies to the value of the gas, will be replaced, for shale gas producers, by a royalty regime with a progressively adjusted rate based on the price of natural gas and the well's productivity.

— When the new shale gas royalty regime takes effect, the tax credit for resources will be abolished in respect of shale gas exploration. It will be replaced by an non-refundable royalty credit.

— Duties on gas will be raised.

— A legal framework will define fair compensations for landowners.

2.1 Principles of the new royalty regime

In the 2009-2010 Budget, the government announced that it would modernize the current natural gas royalty system to guarantee that Quebecers would receive a maximum profit on this resource that they collectively own. The goal was to introduce a system that would be **fair, competitive, predictable** and **simple** to administer.

The new royalty regime was developed according to these principles.

— First of all, under the new system, royalty rates increase with the price of the resource and the productivity of the wells. The government is thus insured of recovering an increasing share of the benefits related to extraction of the resource.

— The government seeks to share these financial benefits fairly so that society as a whole can profit from this new source of wealth creation.

— The government is proposing a regime that is competitive with other jurisdictions, taking into account the economic and geological conditions under which the industry operates in Québec.

— By announcing its new royalty regime now, the government is acknowledging the importance of fixing, in clear and predictable terms, the financial parameters of shale oil production for businesses in Québec, this being an important element in their decision-making process. It is in keeping with this principle of predictability that the new regime will not be applied until the strategic environmental assessment is completed.

❑ Coming into effect of the new royalty regime

The new royalty regime will come into effect once the strategic environmental assessment recommended by the BAPE has been completed and the legal and regulatory framework has been adapted to its conclusions. This will allow the industry the necessary lead time to adapt to the new regime.[12]

12 Other jurisdictions have also allowed lead time for making adjustments. For example, the change-over to a new system in British Columbia was carried out over a period of about six years, and Alberta has provided for a three-year transitional period.

2.2 Royalties

2.2.1 Royalty rates

❑ Current rates

The mechanism under the current royalty regime does not allow the economic or geological context to be taken into account in fixing the applicable royalty rates.

In fact, companies producing natural gas are currently required to pay a royalty at a fixed rate of 10.0% or 12.5% of market value at the wellhead, depending on a well's average daily production.

Royalty rates under the current royalty regime

In Québec, the current royalty regime provides for payment of a royalty of 10.0% or 12.5% of market value at the wellhead, depending on a well's average daily production:

Current royalty regime – Royalty rates on natural gas in Québec

Productivity	Royalty rates
Equal to or less than 2 966 Mcf/d[1]	10% of market value at the wellhead
Greater than 2 966 Mcf/d	10% of market value at the wellhead on the first 2 966 Mcf/d 12.5% of market value at the wellhead on the remainder

1 Thousands of cubic feet per day. The Regulation instead refers to the equivalent in cubic metres, i.e. 84 000 cubic metres.
Source: *Regulation respecting petroleum, natural gas and underground reservoirs*, c. M-13.1, r. 1, s. 104.

However, these rates do not allow the economic or geological context to be taken into account in fixing the applicable royalty rates.

- In fact, in a context where the price of the resource or production volumes are low, the profitability of businesses is reduced. Yet the royalty rate remains inflexible. In such a context, a 10% royalty rate may result in the delay, or even the cancellation, of plans for developing the resource.

Conversely, when the profitability of businesses increases in a favourable context, a fixed royalty rate does not allow the government to increase the share of revenues it derives from the resource.

❑ A new table with higher rates

As in other jurisdictions such as British Columbia and Alberta, the new royalty regime provides for a progressive royalty rate that is calculated for the individual well. It is adjusted depending on the parameters that changed with the value of the resource: the price of natural gas and the productivity of the wells.[13]

The royalty rate varies from 5% to 35%.

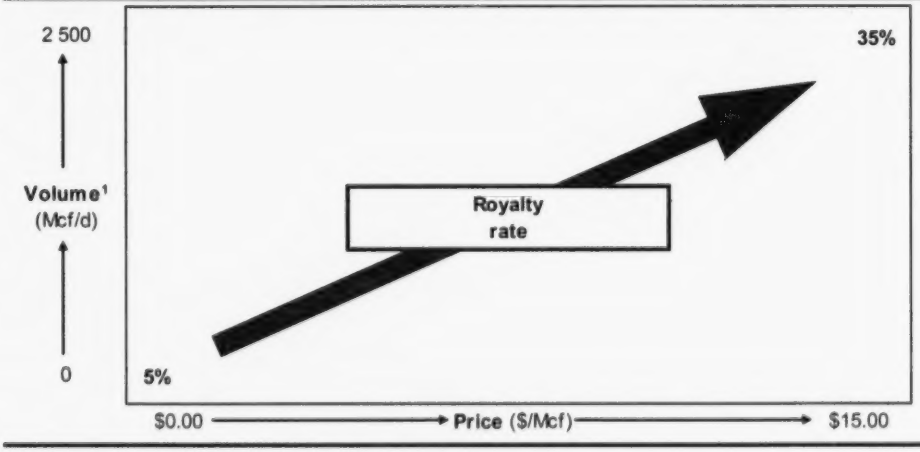
— The 5% royalty rate applies when prices for the resource and production are low.

— The royalty rate rises to 35% when prices and well productivity are high.

The regime will therefore make it possible to more efficiently collect a portion of the value of the resource, while taking into account the economic parameters within which the industry operates.

FIGURE 2

Adjustment of the royalty rate according to price and volume, by well



1 Average production volume per day for a given month.

13 $R_{total} = R_{price} + R_{volume}$. An explanation of how each of these components is calculated is given in the appendix.

■ Rates that vary according to price and production volume

When the price is low, as is the case currently, the industry's profits in Québec are low or nil. The royalty rate that applies at such times is at its lowest. However, when the price rises, the royalty rate quickly increases.

The royalty rate varies also based on production volumes.

— For the time being, well productivity in Québec is low compared to other regions (e.g. Montney in British Columbia).

— This fact is taken into account by the royalty rate. However, when productivity improves, the royalty rate will increase.

TABLE 4

Illustration of royalty rates under the new system based on price and average volume per production day for a given month
(per cent)

	Average volume per day for a given month (thousand of cubic feet)						
	Low			Medium		High	
Price[1]	**250**	**750**	**1 250**	**1 750**	**2 250**	**2 750**	**3 500**
$4.00	5.0	6.1	13.0	19.8	26.6	30.0	30.0
$5.00	5.0	11.1	18.0	24.8	31.6	35.0	35.0
$6.00	9.2	16.1	23.0	29.8	35.0	35.0	35.0
$7.00	11.7	18.6	25.5	32.3	35.0	35.0	35.0
$8.00	14.2	21.1	28.0	34.8	35.0	35.0	35.0
$9.00	16.7	23.6	30.5	35.0	35.0	35.0	35.0
$10.00	19.2	26.1	33.0	35.0	35.0	35.0	35.0

Note: The equations and the table of royalty rates are given in the appendix.
1 The price used to fix the royalty rate will take into account market price, transportation cost, gas processing cost, etc. Terms and conditions will be spelled out in the legal and regulatory framework.

Because a well's production declines rapidly, its first few years are the most productive.

— For example, for an average initial production of 2 250 thousand cubic feet per day, the royalty rate will be 25% initially, and will gradually decline to around 5% after 25 years.

— A lower rate towards the end helps to ensure optimal resource recovery. It extends the lifespan of less productive wells, while maintaining profitability for the business.

Given the fact that royalty rates are adjusted based on price, the average royalty rate throughout the lifespan of a well will be more profitable for the government than under the current system when the price rises above $5.25[14] per thousand cubic feet.

CHART 4

Change in the royalty rate over a 25-year production span[1]
(per cent)

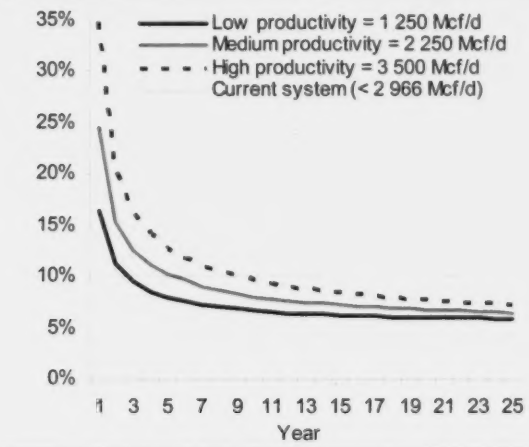
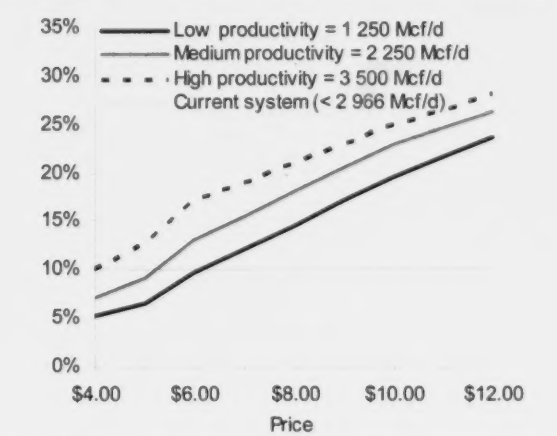


CHART 5

Average royalty rate over a 25-year production span
(per cent)



1 At a constant price ($6/Mcf).

14 Making for an average initial productivity of 2 250 Mcf/d.

2.2.2 Introduction of a non-refundable royalty credit

Currently, investments by businesses producing gas in Québec are eligible for the 15% tax credit for resources.[15]

The government is announcing the elimination of the tax credit for resources with respect to shale gas exploration as of the date the new royalty system takes effect. The tax credit will be replaced by a non-refundable royalty credit for exploration such as exists in most other jurisdictions. The exact terms and conditions of these changes, which are outlined below, will be announced at a later date by the Ministère des Finances.[16]

— The new credit, integrated into the royalty system, will apply to the individual well on the royalties payable, up to 15% of eligible exploration expenses.[17]

— However, it cannot reduce the royalty rate below 5%.

— The full amount of any unused portion of the credit may, however, be carried forward to a subsequent year for the same well.

The royalty credit is advantageous notably because:

— It applies only if gas is being produced: it thus serves as a production incentive.

— It helps to establish the industry and guarantees that the royalty system is competitive[18] with those of other jurisdictions.

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15 The rate is 35% for small businesses during the exploration phase. A rate of 18.75% or 38.75% is applicable for exploration in the Mid-North and Far North.

16 In the Budget Speech or in an information bulletin to be published by the Ministère des Finances.

17 Eligible expenses will be determined at a later date.

18 Royalty regimes in other jurisdictions provide for numerous exceptions based on each jurisdiction's specific situation. In many cases, special incentives are granted (deep wells, high investment costs, etc.).

2.3 Exploration, drilling and operating licences

❑ Oil and natural gas exploration licences

Exploration licences confer the exclusive right to explore a particular territory for oil and natural gas. Over the years, these licences have been granted under the "first applicant" (free mining) system applied in the onshore sector.

Current costs of oil and natural gas exploration licences

According to the provisions covering hydrocarbons in the onshore sector under the *Mining Act* and the *Regulation respecting petroleum, natural gas and underground reservoirs*, any person who shows that they have the financial and technical capabilities to carry out exploration work in Québec's territory may obtain an oil and natural gas exploration licence, provided the territory for which the licence is sought is available and the applicant respects the conditions fixed by regulation. This method of granting licences is in keeping with the principle of universal access to the resource.

An oil and natural gas exploration licence is valid for a term of five year. At the end of that period, however, the licence may be renewed on an annual basis, at most five times.

- The holder of an exploration licence must pay annual duties of $0.10 per hectare for the first five years and $0.50 starting in the sixth year.
- The licence holder must also carry out work worth at least $0.50 per hectare or $3 000 in the first year, with increments of $0.50 per hectare or $3 000 in each subsequent year over the initial five-year period, up to $2.50 per hectare in the fifth year.
- The work to be carried following each annual renewal must be worth at least $2.50 per hectare or $20 000.

Annual minimum investment required
(dollars)

	Cost per hectare	Minimum cost per licence[1]
Year 1	0.50	3 000
Year 2	1.00	6 000
Year 3	1.50	9 000
Year 4	2.00	12 000
Year 5	2.50	15 000
RENEWAL PERIOD (YEARS 6 TO 10)	**2.50**	**20 000**

Note: The cost of the work required is the cost per hectare or the minimum cost, whichever is higher.
1 Equivalent to a territory of 6 000 hectares.
Source: *Regulation respecting petroleum, natural gas and underground reservoirs.*

❑ Well drilling and completion licences

The price of a well drilling licence should normally offset the costs to the government of issuing, managing and monitoring such a licence.

— It should cover, for example, the administrative costs related to preliminary study of the file and issue of the licence.

— It should also reflect the costs of monitoring and supervision while the work is being carried out.

In Québec, fees of $100 are required for a well drilling licence and $50 for a well completion licence. These fees are much higher in other jurisdictions.

TABLE 5

Well drilling licences in various jurisdictions

Jurisdiction	Current fees for a licence	Term of licence and other requirements
British Columbia[1]	$10 300	– The well must be drilled within the first two years after the licence is issued. – An additional fee of $8 000 is charged to a business applying for a licence for the first time.
Pennsylvania[2]	From $2 300 to $2 900[4]	– Work must begin within 12 months after the licence is issued and must proceed until drilling is completed. – If the work is not carried out within the prescribed deadline, the licence holder may renew the permit on payment of an additional annual fee of $100 for two years.
New York[3]	From $3 300 to $4 470[4]	– Work must begin within 180 days after the permit is issued and must proceed until drilling is completed.

1 Source: *Petroleum and Natural Gas Drilling License Regulation*.
2 Source: *Pennsylvania Code*, Title 25, Section 78.
3 Source: *New York Code*, Title 6, Part 552.
4 Fees vary depending on the depth of the well. The fees indicated are for 2 500 and 3 500-metre wells.

❑ Operating leases

Any person who discovers commercially viable oil or natural gas on the territory of their exploration licences can apply for an operating lease. Such leases are currently granted for an annual rental of $2.50 per hectare.

❑ Review of duties on gas

The government is announcing that it will put forward a plan to revise all the duties and licences pertaining to gas, while ensuring that they remain competitive with those of other jurisdictions.

The details will be announced at a later date within the framework of the updating of laws and regulations applying to oil and gas.

2.4 Government revenues and sharing of profits

2.4.1 Government revenues associated with shale gas

To date, several sedimentary basins have been explored in Québec. This work was essentially exploratory in nature.

— During this period, the various revenues collected by the Québec government on oil and natural gas were modest.

— These revenues are essentially related to exploration licences, since the industry has not yet reached the production phase in Québec.

In the future, total revenues from royalties will depend in particular on the number of wells brought into production. The government anticipates that development in the industry will be gradual and, consequently, that there will be a gradual rise in revenues from royalties.

— According to the development scenario for the industry presented by the Ministère des Finances before the BAPE, some 250 wells could be drilled each year, once the industry is up to speed.

— Revenues from royalties collected by the government would reach $275 million in six years.

— In 15 years, revenues would total nearly **$400 million** annually. Total revenues collected by the government would then be more than $440 million, taking into account the royalty credit, revenues generated by the revision of gas duties, and corporate income tax.

Such a development remains subject, however, to numerous conditions such as:

— establishing a legal and regulatory framework that is in keeping with sustainable development and is environmentally responsible;

— determining the real commercial potential of the resource;

— a cost reduction sufficient to offer hope of profitability.

Consequently, the start-up date (year 1) for the industry cannot yet be pinpointed.

TABLE 6

Trends in government revenues under the proposed system[1, 2] – Illustration
(millions of dollars)

	Number of wells in production	Production (in Bcf)	Royalties	Royalty credits	Duties on gas[3]	Corporate income tax[4]	Net government revenues
Year 1	30	14.9	22.9	– 18.2	9.0	0.0	13.7
Year 2	80	32.5	45.5	– 35.3	18.7	0.0	28.9
Year 3	180	67.8	92.7	– 70.6	45.0	0.0	67.1
Year 4	330	113.1	148.7	– 110.2	78.8	0.0	117.2
Year 5	530	165.8	210.1	– 151.5	120.0	0.8	179.4
Year 6	780	224.5	275.5	– 192.7	168.7	2.9	254.4
Year 15	3 030	427.0	398.8	– 206.3	187.5	63.2	443.2

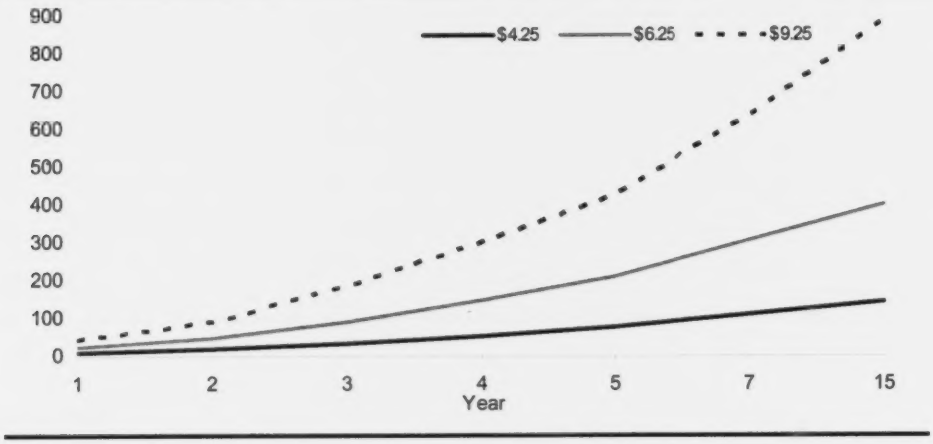
1 At a price of $6.25 per thousand cubic feet.
2 Including duties, royalties and corporate income tax. Excludes other income tax and revenues associated with economic spillovers.
3 Exploration licenses value vary depending on the known natural gas potential of the territory covered. Before 2003, when exploration work was just starting in British Columbia, bonus land sales averaged under $500 per hectare. This rose to $1 000 in 2007 and $3 500 in 2008, generating revenues on the order of $2.7 billion for the province. The Ministère des Finances du Québec has estimated that duties on gas will gradually increase until they equal 10% of total costs in seven years, if conditions are favourable for development.
4 In the first years of production, high investment costs and high fixed charges offset the revenues generated and eliminate any taxable income, so that the corporate income tax payable is nil.

■ Impact of a change in the price of natural gas

A price increase from $6.25 to $9.25 per thousand cubic feet would increase gross revenues from royalties from $400 million to nearly $900 million annually by the 15th year.

CHART 6

Changes in revenues from royalties based on the selling price
(millions of dollars)



❑ Yield from a standard well

As prices and costs now stand, the industry is not profitable. The industry's net losses are $1.5 million per well and, in this context, gross royalties are also low, just $1 million per well.

According to forecasts, the price should, however, reach $6.25 per thousand cubic feet by 2015 and rise higher thereafter. At that price, with costs dropping to $6 million per well, royalties would rise from $1.4 million under the current system to $1.8 million under the new system.

If the price rose to $9.25 per thousand cubic feet, royalties would more than double, compared to royalties generated under the current system, and would total $4.3 million per well.

TABLE 7

Revenues per well for businesses and the government

(current dollars and an initial production volume of 2 250 Mcf/d)

	Current price of $4.25[1]		Priced at $6.25[1]		Priced at $9.25[1]	
	Current regime	New regime	Current regime	New regime	Current regime	New regime
Total gross revenues based on:	**9.6**	**9.6**	**14.1**	**14.1**	**20.9**	**20.9**
Total costs (in $M)	**11.5**	**11.5**	**7.5**	**7.5**	**7.5**	**7.5**
- Well costs (in $M)[2]	10.0	10.0	6.0	6.0	6.0	6.0
Total net revenues	**– 1.9**	**– 1.9**	**6.6**	**6.6**	**13.4**	**13.4**
Government revenues						
- Duties on oil and gas (in $M)	0.0	0.5	0.0	0.8	0.0	0.8
- Royalties (in $M)	1.0	0.7	1.4	1.8	2.1	4.3
- 15% credit on initial costs (in $M)	– 1.4	– 0.2	– 0.8	– 0.8	– 0.8	– 0.8
- Provincial income tax on corporations (in $M)	0.0	0.0	0.7	0.6	1.4	1.1
- Federal income tax on corporations (in $M)[3]	0.0	0.0	0.9	0.7	1.8	1.4
Total government revenues[4]	**– 0.4**	**1.0**	**2.2**	**3.1**	**4.5**	**6.8**
Net profits (losses) for the industry (in $M)	**– 1.5**	**– 2.9**	**4.4**	**3.5**	**8.9**	**6.6**
- Average royalty rate (in %)	10.0	7.1	10.0	13.0	10.0	20.5

1 The selling price for natural gas, in thousands of cubic feet, is composed of the selling price on the NYMEX, plus a mark-up of $0.25/Mcf for market proximity.
2 Well costs include drilling and completion (including fracturing). Development of the industry will reduce costs from $10 million to $6 million.
3 The federal income tax used is that taking effect on January 1, 2012, i.e. 15% of taxable income.
4 Including duties, royalties and corporate income tax, but excluding other income tax and revenues associated with economic spillovers.

2.4.2 Sharing of profits

Royalty rates do not permit adequate measurement of how profits are actually shared between the government and the industry, since they do not take into account the costs related to extraction of the resource.

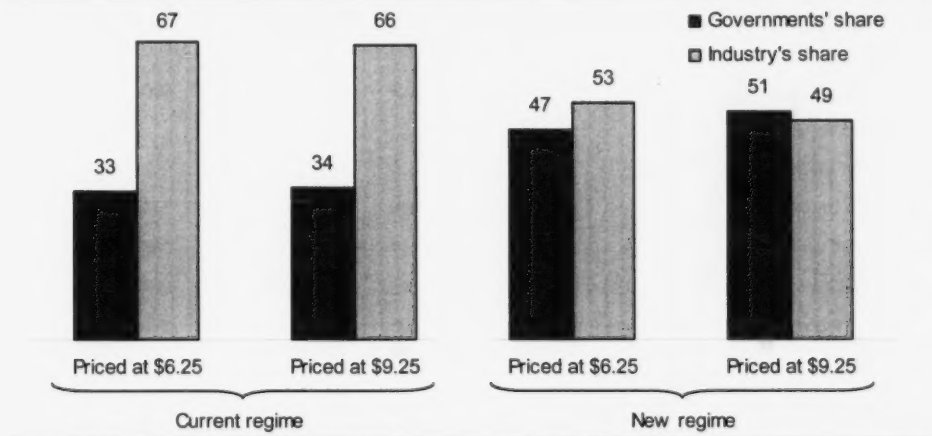
— Sharing of profits must be analyzed taking into consideration gross revenues, costs, as well as the various income taxes and the royalties collected by governments.

— The net profit resulting therefrom represents, in fact, the share of revenues received by businesses. The share going to governments is made up of duties on gas, royalties and corporate income tax.

This approach makes it possible to compare the share going to governments in the net revenues derived from the operation of a well in Québec. Under the current system, the share for all governments comes to nearly one third, whereas it could rise to more than 50% under the new system.

CHART 7

Share of revenues for governments[1] and the industry out of the net revenue from the operation of a shale gas well
(per cent, based on various selling prices for gas)



1 Including duties, royalties and corporate income tax, but excluding other income tax and revenues associated with economic spillovers.

2.5 Compensation for municipalities

In Québec, gas resources belong to all citizens, no matter what region they live in. Royalties collected on these resources must benefit all Quebecers. Thus it would be inappropriate if the government were to pay a portion of the royalties to the municipalities located in the regions where shale gas production is feasible.

— Nevertheless, insofar as certain municipalities might be obliged to assume real and quantifiable costs, they will be compensated.

— Also, the government will ensure that the municipalities are compensated for intangible or less easily quantifiable costs and inconveniences. Indeed, care must be taken that the municipalities where wells are located enjoy the advantages – and not just the drawbacks – resulting from shale gas development.

2.5.1 Compensation for direct additional costs related to shale gas exploration and production

To respond to the concerns expressed by municipalities about the additional expenses they might have to shoulder in connection with shale gas exploration and production, if this industry generates special costs, the government is announcing that measures will be taken to ensure that municipalities are fully compensated for such costs.

— Since the industry is still young, the types of expenses municipalities might have to shoulder are not yet known.

— The government is therefore announcing that municipalities will be compensated for quantifiable additional costs that they may be obliged to shoulder in connection with shale gas exploration and production.

The government will determine, as the industry develops, how such compensation will be financed by gas companies.

2.5.2 Compensation for municipalities during the production phase

As indicated above, the government is not backing away from the principle according to which gas resources and the revenues from royalties associated with those resources belong to all Quebecers.

However, the government seeks to ensure that, as the population as a whole benefits from the production of shale gas, municipalities that might suffer some inconveniences will also derive some benefit.

Thus the government is announcing that a municipality will receive $100 000 for each shale gas well operated on its territory. This sum will be paid out degressively over ten years from the beginning of the production phase:

— $25 000 in the year in which the well begins producing commercially;

— $15 000 in the second year of production;

— $10 000 in the third year;

— $8 000 in the fourth year;

— $7 000 per year for the following six years.

It should be noted that once the industry is up to speed, some 250 new wells are expected to be brought into production each year in Québec.

The government will determine, at the appropriate time, the means by which this compensation will be financed by the gas industry.

2.6 Protection of the rights of landowners

As the shale gas industry develops, many landowners will be called on to negotiate agreements with gas businesses seeking to obtain rights of way across their property for purposes for exploration and production.

Landowners may feel disadvantaged in negotiating with businesses that are used to making these types of agreements and have all the necessary expertise at their disposal.

To facilitate such agreements between exploration licence holders and landowners, the government will establish a legal and regulatory framework fixing the standards to be met by future agreements of this type. Of course, the parties will still be free to agree on conditions even more advantageous to landowners.

3. THE GAS DEVELOPMENT PROGRAM

The profitability of the shale gas industry in Québec is still uncertain and its future will depend on:

— the true potential for developing Québec's subsurface and the mastering of techniques making it possible to increase the quantity of recoverable gas;

— developing commercial infrastructures, including connections with the transportation and distribution network and a local supply of services making it possible to reduce the current cost of drilling a well;

— the new royalty regime and the new legal and regulatory framework to be introduced;

— competitions from other jurisdictions;

— changes in the price of natural gas.

Businesses that have carried out exploration work in Québec in recent year have already invested some $200 million and have not generated any revenues thus far.

— These businesses invested those sums in expectation of future revenues, based on the legal and regulatory framework in place at that time.

In keeping with the requirements that will apply for the strategic environmental assessment in 2012, the Québec government will introduce the gas development program. This program will make it possible to pursue exploration so as to determine the industry's true potential.

Businesses will have the option of:

— taking advantage of the new program; or

— continuing under the general royalty regime.

The introduction of the gas development program will allow businesses to pay lower royalties in the initial phases of some specific projects, which will have to be authorized. On the other hand, royalty rates will increase more rapidly based on a well's profitability.

The program's impact will be to encourage geographic concentration of wells in specific zones, which will facilitate program management, environmental monitoring under the program and cooperation with stakeholders.

3.1 Description of the program

Businesses will have the option of participating in the gas development program for production projects within a defined zone offering good prospects for exploration.

These zones will lie within the territory already covered by the exploration licences held by the business. They will make it possible to concentrate development and thereby manage and reduce the impacts on citizens and municipalities.

The program is inspired by practices in other jurisdictions, such as British Columbia for shale gas and Newfoundland and Labrador and Nova Scotia for offshore oil production.

3.1.1 Principles of the program

Introduction of the program is based on principles that will be lead to sustainable development in the gas production industry in Québec:

— progressive royalty rates;

— limitations on development zones;

— help to establish the industry.

The main goal of the gas development program is to encourage exploration by allowing businesses to pay lower royalties in the initial development and commercialization stages of a specific project, in exchange for higher royalties once they have recouped their investments.

— The government collects a minimum royalty of 2% of gross revenues starting at the time a well is brought into production.

— However, the rate increases markedly thereafter.

This is an alternative program that should facilitate implementation of projects where, because of their high costs and elevated risks, it would be hardly profitable under the general royalty regime.

— Under the program, the return earned by a business at a given level of production will be lower than what it would have earned under the general royalty regime.

— The program will nonetheless be advantageous for businesses, since it reduces the risks inherent in projects, especially the lack of information on production potential.

— To do so, the program will rely on progressive royalty rates.

3.1.2 Terms and conditions of the program

❑ Development of a defined zone

An eligible business may apply to the program for the development of a defined zone within a territory covered by an exploration licence.

— This zone will correspond to a portion of the territory covered in the exploration licences held by the business.

— It will be up to the industry to choose the zones covered by exploration licences, but the zones chosen must be approved by the government, which will collect all the information necessary for carrying out the economic and environmental assessment, including the level of acceptance by the community.

— A business that opts to carry out an investment project under the program will be required to comply with it throughout the useful life of the wells within the designated zone.

— Projects eligible for the program will not be eligible for the royalty credit within the designated zone.

Wells that have been a included in the strategic environmental assessment will be eligible for the program.

— The costs incurred by businesses in carrying out these studies will also be considered eligible expenses.

— Wells drilled outside the zone will continue to be covered by the general royalty regime.

❑ Calculation of royalties

The royalty rate under the gas development program is progressive and varies on a monthly basis through a four-tiered scale.

Progression from one tier to the next is determined by the returns generated by the project.

— At tier 1, the business pays a minimum of 2% of gross revenue as royalties until it reaches the required rate of return (0% + interest rate). If it does not reach the required rate of return within ten years, it is automatically moved up to tier 2.

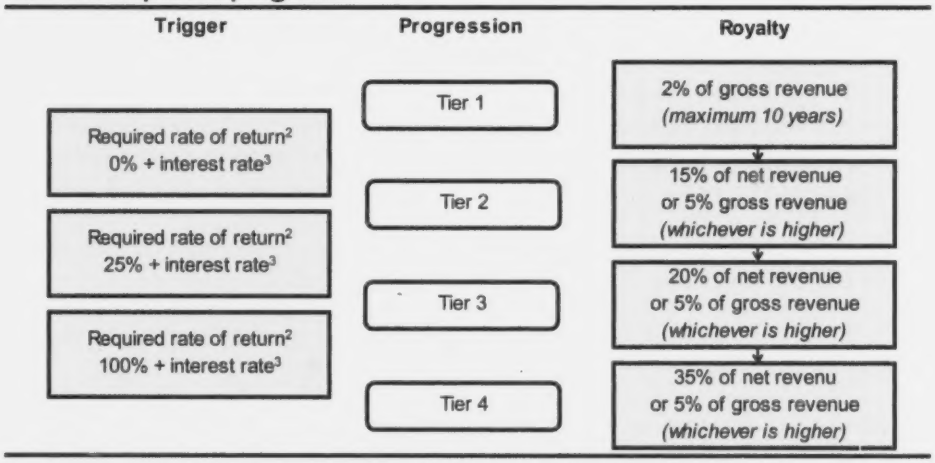
— After the business reaches tier 2, the royalty is 15% of net revenue or 5% of gross revenue, whichever is higher.

— The business moves up from tier 2 to tier 3 when it reaches the required rate of return (25% + interest rate). At tier 3, the royalty is 20% of net revenue or 5% of gross revenue, whichever is higher.

— The business moves up from tier 3 to tier 4 when it reaches the required rate of return (100% + interest rate). At tier 4, the royalty is 35% of net revenue or 5% of gross revenue, whichever is higher.

CHART 3

Gas development program[1]



1 The rate may be modified as changes are made to the legal and regulatory framework, in keeping with the principles underlying the implementation of the program.
2 The required rate of return has been reached when the business has recouped all of its eligible investment and operating costs and achieved the rate of return specified on its initial investment for that stage.
3 For the purposes of the program, interest cost will be equal to a rate available on the Canadian market. For example, British Columbia uses the Canadian government monthly long-term bond rate. In February 2011, this rate was 3.75%.

❑ Allowed costs

As a general rule, allowed costs under the program in calculating royalty rates correspond to costs directly attributable to the project within the designated zone.

— The principal allowed costs incurred within the zone include exploration and development costs, operating costs, costs for connecting to the transportation and distribution network, environmental costs, as well as construction costs for roads if they are strictly related to the zone designated by the business.

— Other expenses that are not closely related to the project in the designated zone, such as administrative costs, are not eligible in calculating royalty rates.

❑ Call for project proposals

In 2012, once the gas development project has been introduced, the government will undertake, for a limited period, a call for project proposals from businesses.

This sort of initiative does not exclude a public equity participation – or any other form of arrangement between businesses – in the definition of the projects. At that stage, the government may therefore consider more actively participating in the financing of projects.

Examples of allowed costs under British Columbia's Net Profit Program

Allowed costs

As a general rule, the allowed costs used in calculating royalty rates for a project under the Net Profit Program are:

- historical costs, representing costs directly attributable to the project within the designated zone, dating back no farther than five years before the application date;
- exploration costs, that is, drilling costs and exploration costs directly related to the project;
- development costs:
  - all drilling costs and all costs directly related to the project (camps, roads, seismic prospecting, fees for rights of way, etc.).
- operation expenses within the zone designated by the project only;
  - co-generation expenses are included (electricity, transportation, etc.);
  - carried-over losses are included;
- all environmental costs assumed by the company may be claimed;
- costs related to project abandonment or end of project may also be claimed (three years in which to recoup costs once activities have ceased);
- road construction costs and transportation costs are also included if they are strictly related to the project in the "designated zone" (e.g. connection to the distribution network).

Non-allowed costs

Certain other expenses that are not integral to the project are not eligible, such as:

- the cost of obtaining production rights;
- income tax, sales tax and royalties paid;
- incentives (tax credits, government assistance, etc.);
- administrative costs (overhead costs);
- charitable gifts;
- costs related to public relations and marketing;
- corporate insurance unrelated to the project.

4. BENEFITS FOR ALL QUEBECERS

The government is preparing for eventual development of the shale gas industry in Québec's territory– insofar as such development is environmentally responsible and safe for all citizens.

Such development would have significant economic impacts that would benefit all Quebecers.

— Production of shale gas would create or support approximately **11 000 jobs in Québec** annually.

— Introduction of a new royalty regime would also generate revenues that would benefit Québec society as a whole, a portion of which would be **set aside for future generations**: the government is announcing immediately the use it intends to make of the royalties thereby obtained.

4.1 Creation of or support for 11 000 jobs in Québec

The necessary parameters for assessing the economic impacts of shale gas production are numerous. As this activity is relatively recent, these impacts are not fully identified.

We can be certain, however, of two economic consequences related to shale gas production that would benefit Québec:

— Since the implementation of NAFTA, the North American natural gas market has become integrated. Price differences essentially reflect transportation costs. Local production in Québec would reduce transportation costs – which would directly benefit users and the economy as a whole.

— Some $2 billion are spent by Québec each year to import natural gas from Western Canada. Excluding induced effects, such as increased consumption and imports of extraction equipment, this would mean an additional $2 billion in Québec's GDP.

❑ Economic impact of shale gas development

The development of shale gas production would make it possible to create or support approximately 11 000 jobs annually in Québec.[19] The development of this sector would also create well-paying jobs, helping to raise average wages in Québec.

From an economic point of view, jobs stimulate consumption and investment, and help to harness the potential of individuals while encouraging them to participate in wealth creation.

— The results show that **an annual investment of $1.5 billion** for shale gas exploration and production would make it possible to support, on average, nearly **11 000 jobs** annually during the investment phase.

— The development of the gas sector in Québec would be gradual. It is expected to take several years to reach the level where $1.5 billion is invested annually.

The table below illustrates the growth in number of wells and level of investment based on a scenario assuming a cost of $6 million per well once the industry is up to speed.

— Based on this scenario, when production has reached maturity, some 250 wells could be drilled in Québec annually.

— The number of jobs created by development of the sector would also increase gradually, reaching the level of 11 000 jobs by the sixth year.

19 The impacts on employment are estimated by the Ministère des Finances du Québec using the intersectoral model for the Québec economy of the Institut de la statistique du Québec. More specifically, the structure of oil and gas expenses in Canada is applied to Québec's intersectoral model.

TABLE 8

Number of jobs per year based on the number of wells

	Wells per year	Production	Average investment[1]	Jobs
	(Number)	(Bcf)	($M)	(Number)
Year 1	30	14.9	240	1 740
Year 2	50	32.5	365	2 650
Year 3	100	67.8	650	4 720
Year 4	150	113.1	900	6 530
Year 5	200	165.8	1 200	8 700
Year 6	250	224.5	1 500	10 880

1 Cost per well declines progressively from $8 M in the first year, stabilizing at $6 M beginning with the fourth year.

According to this scenario, investments on this scale could result in an extra $500 million being added to the payroll annually. Development of the gas sector in Québec would create well-paying jobs.

❑ Estimates by other organizations

Studies of the economic impacts of shale gas production are few.

Among the best-known studies are those of the Perryman Group in Texas, the University of Arkansas, the Marcellus Shale Education & Training Center in Pennsylvania and SECOR in Québec. These studies use input-output models that have a high enough level of disaggregation so that economic sectors can be identified.

The following table draws together the principal conclusions of these studies in terms of impacts on employment. The results were adjusted to render them comparable.[20]

— The table shows that, for an investment of $1.5 billion, estimates vary from 9 000 to 27 000 jobs.

20 In particular, to illustrate job creation associated with a $1.5 billion investment.

TABLE 9

Jobs created according to various sources
(job-years, corresponding to a $1.5 billion investment)

	Location	Jobs
Ministère des Finances	Québec	10 880
Perryman Group[1]	Texas	26 810
University of Arkansas[2]	Arkansas	9 140
Marcellus Shale Education & Training Center (MSETC)[3]	Pennsylvania	19 750
SECOR[4]	Québec	11 750

1 Perryman Group, *Drilling for Dollars: An Assessment of the Ongoing and Expanding Economic Impact of Activity in the Barnett Shale on Fort Worth and the Surrounding Area*, March 2008.
2 Sam M. Walton College of Business, University of Arkansas, *Projecting the Economic Impact of the Fayetteville Shale Play for 2005-2008*, May 2006.
3 Marcellus Shale Education and Training Center, *Marcellus Shale Workface Needs Assessment*, summer 2009.
4 SECOR, *Évaluation des retombées économiques du développement des shales de l'Utica*, May 2010.
Sources: Ministère des Finances du Québec, from the sources mentioned.

❑ Impact on unemployment observed in other jurisdictions

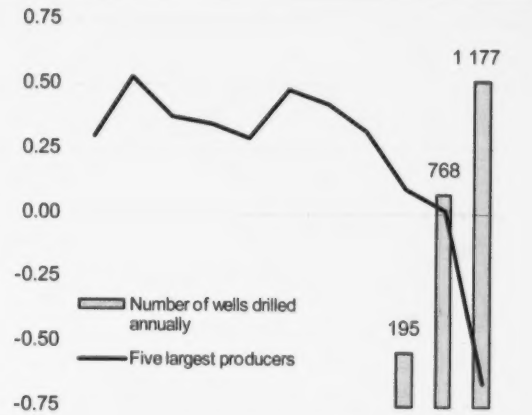
Pennsylvania and Arkansas already produce significant volumes of shale gas. Also, oil production in those two states is lower than in other shale gas producing states, such as Texas and Louisiana.

— Shale gas is produced in Pennsylvania in 27 counties, with 86% of production concentrated in five counties. The labour force in the five highest producing counties totals 200 000 workers, representing 3.6% of the state's labour force.

— In Arkansas, shale gas is produced in ten counties, with 99% of production concentrated in five counties. The labour force in the five highest producing counties totals 120 000 workers, representing 19.4% of the state's labour force.

CHART 8

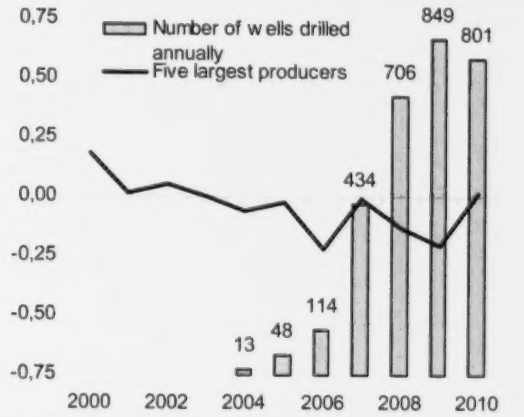
Comparative unemployment rates and number of wells for Pennsylvania
(difference between the unemployment rate for the five highest producing counties and the state as a whole)



Source: Bureau of Labor Statistics, Pennsylvania Department of Energy. Compilation by the Ministère des Finances du Québec.

CHART 9

Comparative unemployment rates and number of wells for Arkansas
(difference between the unemployment rate for the five highest producing counties and the state as a whole)



Source: Bureau of Labor Statistics, Arkansas Oil and Gas Commission. Compilation by the Ministère des Finances du Québec.

Although multiple factors may influence the gap between the unemployment rates, these two states demonstrate that a **decline in unemployment** could be observed, mainly in the regions where gas is produced. This impact could, however, vary according to regional conditions – particularly the initial level of unemployment.

4.2 Royalties set aside in part for future generations

The introduction of the new natural gas royalty regime offers Québec a good opportunity to benefit from the development of its natural resources, and in a manner that is environmentally responsible.

— Responsible use of the revenues from natural resources must take into account whether or not the resources are renewable. These royalties must thus be used so that society as a whole receives a fair share of the benefits derived from the development of those resources, while guaranteeing intergenerational fairness.

— The sustainability of renewable resources enables the government to allocate the royalties derived from those resources to funding normal public services and investments designed to ensure resource renewal.

— Development of non-renewable natural resources limits the opportunity for future generations to benefit from them. Thus, so that all Quebecers, of both the current generation and future generations, can enjoy their fair share of the advantages derived from shale gas production, a portion of these royalties must be set aside for future generations by reserving them for debt repayment.

The government is announcing that it will **allocate to the Generations Fund 25%** of net mining, oil and gas royalties in excess of $200 millions. These revenues will therefore be reserved to help pay down the debt.

CONCLUSION

Adoption of the new royalty regime on gas resources will permit all Quebecers to obtain a maximum benefit from the resource that they collectively own.

This royalty regime falls in line with the government's determination to ensure that exploration for and development of Québec's gas resources are conducted harmoniously.

Under the new system, assuming 250 wells being brought into production annually, the economic and budgetary spillovers will make it possible to:

— generate $1.5 billion in investments;

— create or support 11 000 jobs, which will make it a major sector of economic activity;

— levy net total revenues for the government of more than $440 million, including more than $100 million that will be devoted to paying down the debt.

TABLE 10

Economic impacts of shale gas in Québec over the years

	Wells per year	Production	Average investement[1]	Jobs	Net government revenues[2]
	(number)	(Bcf)	(in $M)	(number)	(in $M)
Year 1	30	14.9	240	1 740	13.7
Year 2	50	32.5	365	2 650	28.9
Year 3	100	67.8	650	4 720	67.1
Year 4	150	113.1	900	6 530	117.2
Year 5	200	165.8	1 200	8 700	179.4
Year 6	250	224.5	1 500	10 880	254.4
Year 15	250	427.0	1 500	10 880	443.2

1 Cost per well declines progressively from $8 M in the first year, stabilizing at $6 M beginning with the fourth year.
2 Including duties, royalties and corporate income tax, but excluding other income tax and revenues associated with economic spin-offs.

By enhancing the government's capacity to collect more revenues from the production of shale gas, the new royalty regime will contribute to the funding of public services and help to pay down the debt.

APPENDIX

❑ Royalty rate calculation tables

The royalty rate ranges from a low of 5% to a high of 35%. It results from adding together the price component and the volume component.

$R_{total} = R_{price} + R_{volume}$

TABLE 11

Calculation of royalty rate components

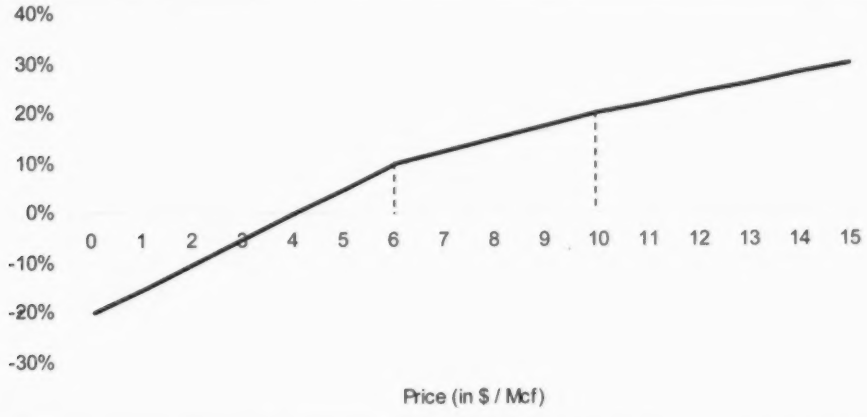
Price component (R_{price}) (dollars per thousand cubic feet)	**Calculation** (per cent)
$0 to $6	(Price[1]) * 5% - 20%
Above $6 to $10	(Price - $6) * 2.5% + 10%
Above $10 to $15	(Price - $10) * 2% + 20%
Above $15	30%
Volume component (R_{volume}) (thousands of cubic feet per day for a given month)	
0 Mcf to 300 Mcf	Volume * (5/300)% - 5%
Above 300 Mcf to 2 500 Mcf	(Volume - 300 Mcf) * (3/220)%
Above 2 500 Mcf	30%

1 The price used to fix the royalty rate will take into account market price, transportation cost, gas processing cost, etc. Terms and conditions will be spelled out in the legal and regulatory framework.

CHART 10

Changes in royalties based on price[1]

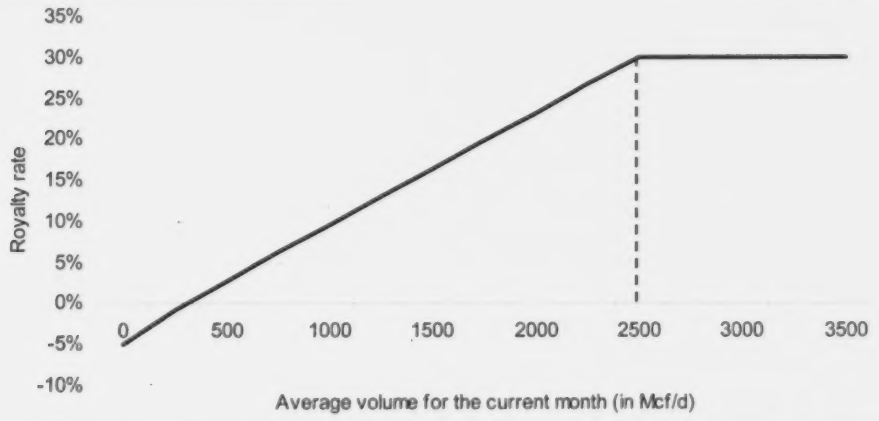
(per cent and dollars)



1 The price used to fix the royalty rate will take into account market price, transportation cost, gas processing cost, etc. Terms and conditions will be spelled out in the legal and regulatory framework.

CHART 11

Changes in royalties based on volume
(per cent and thousands of cubic feet per day)



❑ Royalty rate table

TABLE 12

Royalty rate table
(per cent)

	Average volume per day for the current month (thousands of cubic feet)											
Price[1]	**250**	**500**	**750**	**1 000**	**1 250**	**1 500**	**1 750**	**2 000**	**2 250**	**2 500**	**2 750**	**3 000**	**3 500**
$3.00	5.0	5.0	5.0	5.0	8.0	11.4	14.8	18.2	21.6	25.0	25.0	25.0	25.0
$4.00	5.0	5.0	6.1	9.5	13.0	16.4	19.8	23.2	26.6	30.0	30.0	30.0	30.0
$5.00	5.0	7.7	11.1	14.5	18.0	21.4	24.8	28.2	31.6	35.0	35.0	35.0	35.0
$6.00	9.2	12.7	16.1	19.5	23.0	26.4	29.8	33.2	35.0	35.0	35.0	35.0	35.0
$7.00	11.7	15.2	18.6	22.0	25.5	28.9	32.3	35.0	35.0	35.0	35.0	35.0	35.0
$8.00	14.2	17.7	21.1	24.5	28.0	31.4	34.8	35.0	35.0	35.0	35.0	35.0	35.0
$9.00	16.7	20.2	23.6	27.0	30.5	33.9	35.0	35.0	35.0	35.0	35.0	35.0	35.0
$10.00	19.2	22.7	26.1	29.5	33.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
$11.00	21.2	24.7	28.1	31.5	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
$12.00	23.2	26.7	30.1	33.5	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
$13.00	25.2	28.7	32.1	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
$14.00	27.2	30.7	34.1	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
$15.00	29.2	32.7	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0

1 The price used to fix the royalty rate will take into account market price, transportation cost, gas processing cost, etc. Terms and conditions will be spelled out in the legal and regulatory framework.

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